

Harnessing Italy's solar power potential



In the space of just nine short months between December 2010 and August 2011, ABB successfully delivered 14 photovoltaic power plants in Italy with a combined generating capacity of more than 100 MW.

All 14 plants were delivered within very challenging timeframes. Twelve were completed several weeks ahead of schedule, and one 24 MW plant was built and commissioned within just five months.

As the EPC (engineering, procurement and construction) contractor for all 14 plants, ABB is proud to be playing such a defining role in the development of Italy's solar power industry.

In the first six months of 2011, Italy installed three times more generating capacity in photovoltaic (PV) power plants than Germany, the world's leading photovoltaic market. Although there were several reasons for this intense activity, Italy is undoubtedly the focal point of the global photovoltaic industry at this point in time. It has the second largest installed PV capacity in the world, and is predicted by some forecasters to overtake Germany within the next few years.

ABB is playing a leading role in the growth and development of the Italian solar power market, providing turnkey solutions that are geared to reduce the cost and risk of constructing and operating photovoltaic power plants.

Our capability includes extensive experience as an EPC contractor, rapid project execution within the shortest possible delivery times, optimized solutions that achieve the highest level of efficiency, and a fully developed operations and maintenance concept with remote monitoring from a dedicated ABB control center in Genoa.

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A single supplier for the entire project

ABB provides a turnkey solution for the entire project. We perform the design and engineering, and provide a well-proven and highly optimized modular solution comprising market-leading ABB power and automation products. We clear the site and install and commission the equipment, and we connect the plant to the transmission grid or distribution network.

ABB has a long and successful track record as an EPC contractor. Over the past 45 years we have completed more than 300 EPC projects worldwide in the power generation, water and oil and gas industries. Fittingly, our EPC global center of excellence is located in Genoa, which means that much of ABB's expertise in executing turnkey projects is readily at hand for the local market.

This EPC capability provides the banks and institutions financing the project with the strong, low-risk contractor's name they require before committing their capital. They know that ABB is not only a global leader in the power and automation industries, with annual revenues of around \$31.5 billion, but that ABB Italy is a strong and leading company in its own right, with revenues of \$3.5 billion (EUR 2.5 billion) in 2010. With ABB the banks and institutions know that the project is in safe and expert hands.

Fast delivery to meet feed-in tariff deadlines

ABB's track record in rapid delivery is second to none. Of the 14 PV plants that ABB delivered over the nine-month period, 12 were completed several weeks ahead of schedule; the other two were handed over on the contracted date of delivery.

There are several reasons why ABB is able to execute projects quickly:

- First, as a world leader in power and automation products and systems, ABB has a huge manufacturing capacity from which to draw on for each solution. Our procurement channels and supply chain processes are designed for efficient and speedy processing. Once the contract has been signed ABB sets the wheels turning. Not a moment is lost in the race to meet the delivery deadline
- Second, ABB has agreements with local subcontractors in Italy, with whom we have a successful record of collaboration and on whom we can rely to meet a customer's deadline, however pressing it may be
- Third, ABB exercises its EPC competence and electrical expertise to manage and execute complex site processes. For instance, in one project, there were up to 500 workers on site at any one time, all of whom had to be deployed and managed efficiently and in compliance with health and safety regulations. ABB was able to deliver that project within five months – at 24 MW it is one of the largest PV plants in Italy – by performing civil works, installation and commissioning simultaneously at different parts of the site.

Did you know?

ABB has long been at the forefront of the solar power industry.

In the 1980s ABB developed the plant automation platform for the world's first concentrating solar power (CSP) test facility in Spain, and is now a leading supplier of turnkey CSP plants based on the uniquely cost-effective technology of its partner, Novatec Solar.

In 2010 we delivered comprehensive solutions for the world's first integrated solar and combined cycle power plants in Algeria, Egypt and the United States.

And, in PV power plants we have an extensive reference list of solutions that not only covers the length and breadth of Italy, but much of the northern Mediterranean as well.

Optimized solutions from a world leader in power and automation technologies

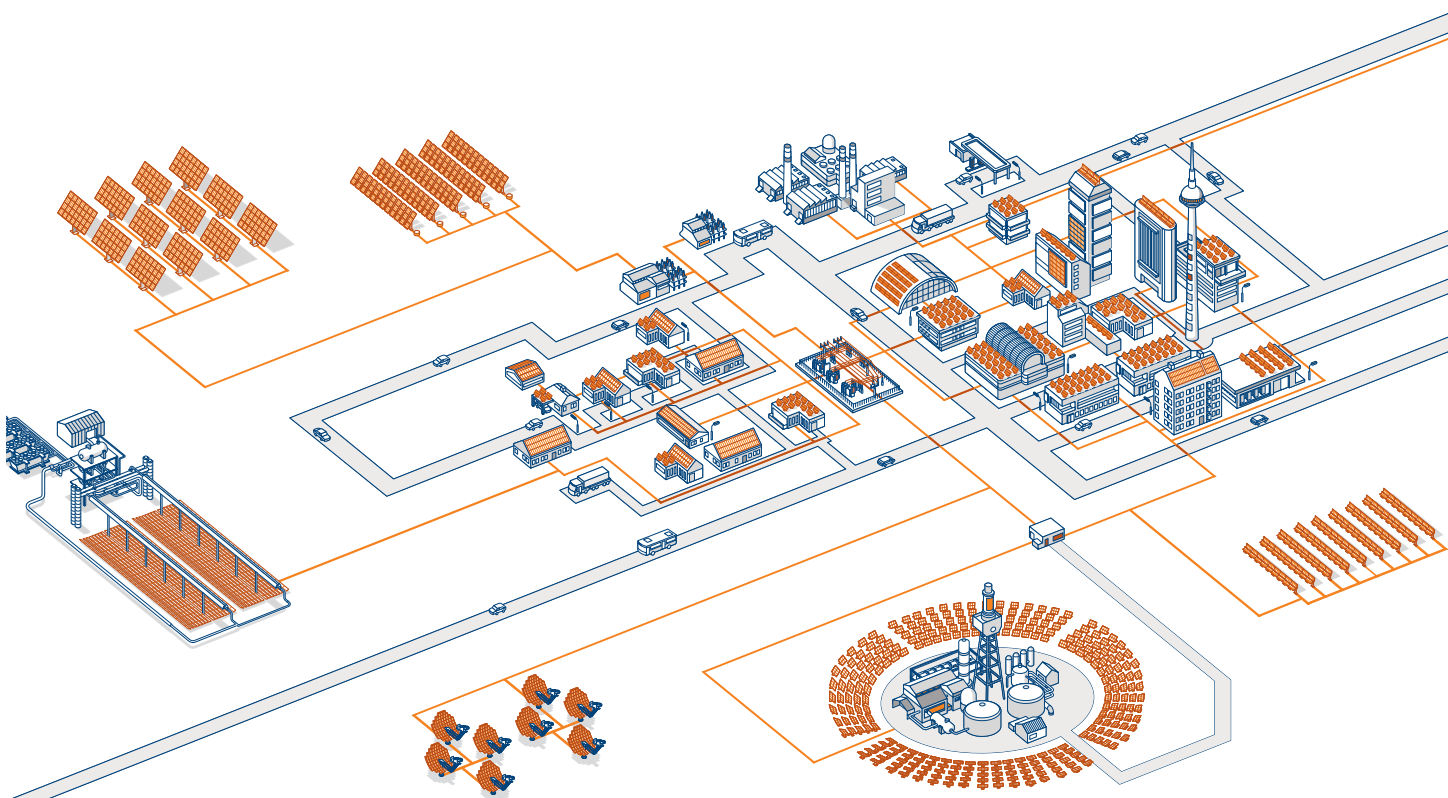
As a market and technology leader in power and automation products and systems, ABB has a unique understanding of the electrical and control equipment that make up a photovoltaic power plant – switchgear, transformers, inverters, programmable logic controllers, distributed control system, cables and grid connection.

Although ABB does not manufacture the photovoltaic panels, we have extensive experience of working with all types of panel and of integrating them into optimized solutions that are adapted to the meteorological and physical characteristics of each site. Each solution achieves the peak performance ratio required by the customer. This is usually in the range of 80-87 percent, and is guaranteed by ABB for at least the first 12 months of operation.

Remote operation and maintenance

Service is one of ABB's key competences. Over the past 10 years ABB has built up a remote assistance service for power generation facilities, and now provides several hundred plants with remote monitoring from a dedicated control room in Genoa. This same concept is also available for photovoltaic plants. All but one of the plants for which ABB has recently provided solutions for in Italy are now monitored by remote from Genoa.

The concept has several compelling benefits. It monitors the entire plant in real time and sends alarms when something is not performing optimally. The alarm is diagnosed in the control room by an authorized technician, who either rectifies the problem immediately or dispatches a service team to the plant if required. Most importantly for the customer, the advanced software that ABB has developed for solar power plants collects and builds up a bank of critical data on plant and equipment performance. This is then used, among other things, to forecast plant output for the following day.



14 plants and 102 MW in nine months

A guide to ABB's reference list for Italy, December 2010 – August 2011

“REC is pleased to work with BNP Paribas and ABB to realize this landmark project. Good collaboration with the banks throughout the development process made it possible to utilize an efficient financing solution.”

John Anderson Jr., Executive Vice President and Group Chief Operating Officer, REC

Rapid delivery of 24 MW plant on a challenging 95-hectare site Canino PV power plant, Lazio

Customer: Phenix Renewables (owned by CEF Energie and MedEnergy Group)

Capacity: 24.2 MW

Delivery schedule: 5 months. Energized on schedule, April 2011

CO₂ displacement: 18,500 tons per annum

REC Systems, part of Renewable Energy Corporation (REC), one of the world's largest producers of polysilicon and wafers for solar applications, aligned with ABB as consortium partner for a 24.2 MW photovoltaic power plant in Lazio.

The project is the largest lease financing solution for a PV project ever undertaken in Italy. REC is supplying the plant's 103,488 modules, with ABB responsible for the execution of the project.

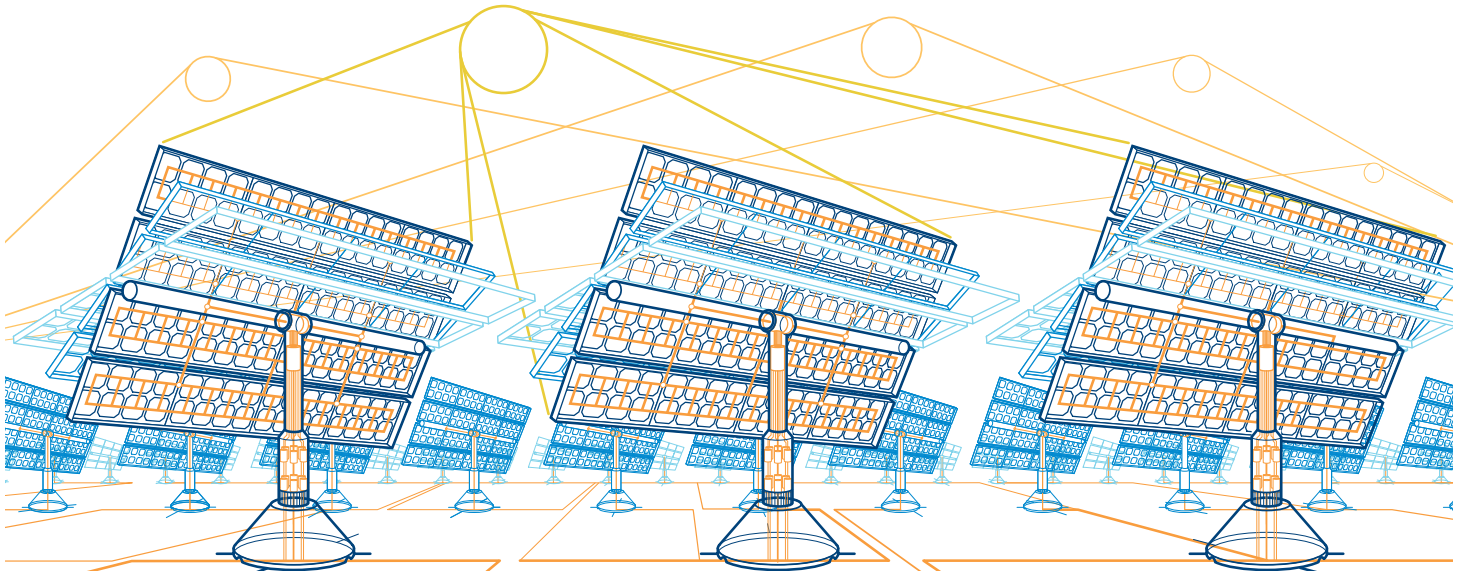
ABB's scope of supply includes design, engineering, supply, installation and commissioning of the plant. In addition to the electrical and control equipment, ABB also supplied a 150 kV substation equipped with a state-of-the-art ABB monitoring and control system to ensure the efficient and reliable transfer of power from the plant to the Terna transmission grid.

ABB successfully completed the project within the stipulated timeframe of five months, thereby enabling Phenix Renewables to qualify for the targeted feed-in tariff.

Among the challenges that ABB had to contend with were the overall poor condition and hilly profile of the site, which required extensive site works during the wet winter season and detailed design to ensure that all the modules would have maximum exposure to sunlight. To meet the tight project deadline, ABB had to perform civil works, installation and commissioning simultaneously at different parts of the site, while managing a site workforce of up to 500 people at any one time.

Although contracted to achieve a peak performance ratio of 81.5 percent, the site is currently operating at 87 percent, thanks to the high degree of optimization and low power losses of the ABB solution.





39 MW plant completed six weeks ahead of schedule PV power plant, Foggia

Customer: a special purpose company

Capacity: 39 MW (three plants)

Delivery schedule: 6 months. Completed six weeks ahead of schedule, July 2011

CO₂ displacement: 28,130 tons per annum

The customer - a special purpose company financed by a leading investment fund that focuses on renewable energy - required a financially sound and 'big name' EPC contractor capable of delivering a turnkey solution within a short delivery time in order to qualify for a high feed-in tariff.

The three plants have a combined generating capacity of 39 MW (14.5 MW, 12.7 MW and 11.8 MW). All three plants are equipped with fixed photovoltaic systems of between 51,000 and 62,000 modules. Two of the plants are adjacent to one another, with the third located some 3 km distant.

ABB provided a complete solution including design, engineering, civil works, procurement, installation and commissioning. The solution is highly optimized to ensure a high level of efficiency and low power losses. It includes ABB's electrical balance of plant modules, as well as a state-of-the art distributed control system and human machine interface.

As part of the contract ABB also provided a 150 kV substation, which links the three plants via a 10 km cable to the Terna transmission grid.

ABB was contracted to execute and commission the entire project within six months. The project was successfully completed and handed over 40 days ahead of schedule (including the substation), thereby enabling the customer to win a substantial gain in production and qualify for the targeted feed-in tariff.

ABB is responsible for remote monitoring of the plants from its dedicated PV control center in Genoa.





Multi-plant project with rapid delivery and high efficiency **Actelios Solar PV plant, Sicily**

Customer: Actelios Solar (part of the Falck Group)

Capacity: 13.1 MW (three plants)

Delivery schedule: 6 months. Completed on time, April 2011

CO₂ displacement: 9,400 tons per annum

Falck Renewables operates wind, solar, biomass and waste-to-energy plants in Italy, the UK, France and Spain. The three plants in western Sicily are the largest in its growing portfolio of photovoltaic assets in Italy.

Through its subsidiary Actelios Solar, Falck Renewables selected ABB to provide three photovoltaic power plants with a combined generating capacity of 13.1 MW at Spinasantà (6 MW), Cardonita (3.8 MW) and Sugherotorto (3.3 MW).

ABB was selected for its ability to act as EPC contractor and provide a highly optimized solution with a very high peak performance ratio of 87 percent for two of the plants and 85 percent for the third.

ABB's scope of supply extended from design and engineering to ground and civil works, procurement, installation and commissioning, as well as to providing the medium voltage connection to the local distribution network. On the products side ABB provided a complete solution, including transformers, switchgear, inverters, protection devices and an advanced control system with remote monitoring and diagnostic capability. The photovoltaic cells (totalling almost 57,000) and support structure, at a tilt angle of 20 degrees, were also supplied by ABB.

Thanks to ABB's efforts, Falck Renewables was able to qualify for the feed-in tariff incentives on time.

Two 5 MW PV plants delivered in less than 10 weeks **Helios ITA-3, Brindisi and Mesagne**

Customer: Etrion Corporation

Capacity: 10 MW (two plants of 5 MW)

Delivery schedule: 3 months. Completed in less than 10 weeks, August 2011

CO₂ displacement: 6,700 tons per annum

Etrion Corporation is an independent solar power producer with 60 MW of operational ground-based PV power plants in Italy.

ABB was awarded the EPC contract by Etrion at the beginning of June 2011, three months before the end of the current feed-in tariff was due to expire on August 31. With just three months to complete and connect two 5 MW plants – and during the course of the national vacation period of late July and August – ABB had a challenging deadline to meet.

Site clearance began in early June and the plants were completed and ready to run two weeks ahead of schedule and the August 31 deadline.

ABB was responsible for the full scope of supply – design, engineering, civil works, installation and commissioning of both plants, as well as connection to the Enel power distribution network. In addition ABB supplied all the power and automation equipment, including the electrical balance of plant modules and an advanced distributed control system. ABB is also providing remote operation and maintenance from its dedicated remote control center in Genoa.

Each plant consists of 22,500 polycrystalline modules mounted on single-axis trackers.

“We completed the Helios ITA-3 parks ahead of schedule and under budget thanks to the hard work of our EPC contractor ABB, who worked closely with our superb local team, our contractors and the local utility, Enel.”

Marco Northland, CEO Etrion



15 MW multi-plant project completed three weeks ahead of schedule

Macchia Rotonda PV power plant, Foggia

Customer: Macchia Rotonda Srl

Capacity: 15.1 MW (four plants)

Delivery schedule: 6 months. Completed three weeks ahead of schedule, August 2011

CO₂ displacement: 9,800 tons per annum

ABB completed its first project for Macchia Rotonda Srl three weeks ahead of schedule and well in advance of the August 31, 2011 deadline for the higher feed-in tariff.

The project consists of four plants of varying capacity located within a 10 km area: Macchia Rotonda is the largest at 6.6 MW, followed by Iacovangelo (3.5 MW), Inicorbaf (3 MW) and Armiento (2 MW).

ABB was selected by Macchia Rotonda Srl to act as the EPC for all four plants and was given six months to complete the project and ensure that the customer qualified for the targeted feed-in tariff.

Despite heavy rainfall in the winter months of February and March, which caused delays in site clearance and plant erection, ABB was able to make up for lost time and complete comfortably within the deadline.

ABB's scope of supply included design, engineering, installation, commissioning and connection via a 10 km cable to the Enel transmission grid. ABB also supplied the full range of power and automation equipment including switchboards, inverters, transformers, medium voltage cabinets, medium and high voltage cables, distributed control systems and control software.

The plant is operating at the stipulated peak performance ratio of 80 percent.

0.8 MW roof-top PV plant

Cairo Montenotte, Liguria

Customer: Peter Srl

Capacity: 0.864 MW

Delivery schedule: 4 months. Completed one week ahead of schedule, August 2010

CO₂ displacement: 0.5 tons per annum

ABB completed this large-scale roof-top PV plant one week ahead of the challenging four-month schedule.

The plant is located on the roof of an industrial building owned by Gruppo Pensiero in the town of Cairo Montenotte in Liguria. The plant consists of 3,840 PV panels installed on fixed structures and generates 0.864 MW of electric power. The power is not used by the facility but transferred to the 15 kV distribution network, which is operated by Enel.

ABB was selected to provide a turnkey solution by Peter Srl, a joint venture between Gruppo Pensiero and Tersia, a company that develops and manages renewable energy projects.

ABB was contracted to supply the entire solution with the exception of the panels, which were supplied by the customer. ABB was responsible for design, engineering, installation, commissioning and grid connection. Products supplied include the support structures for the panels, inverters, medium voltage switchgear and transformers, low voltage equipment, cables, protection, monitoring and control systems, and auxiliary systems (lighting and ventilation).

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